KHOKHLOV, P.L.; DUBROV, V.S.; SLEPTSOV, N.I.; SAYAPIN, Yu.V.

Analysis of cupola performance with various methods of water cooling. Lit.proizv. no.7:36-37 Jl '62. (MIRA 16:2)
(Cupola furnaces—Cooling)

BELYAYEV, M.G.; KHOKHLOV, P.M.

In the Ryazan Leather Plant named after the October Revolution.
Kozh.-obuv.prom. 6 no.1:5-7 Ja '64. (MIRA 17:4)

KHOKHLOV, P.M.

Improve the quality of chrome leather for shoe uppers. Kozh.-obuv. prom. 6 no.3:7-10 Mr '64. (MIRA 17:4)

KHOKHLOV, P.M.

From the work practices of leather factories. Kozh.-obuv.prom. 4 no.6:4-7 Je '62. (MIRA 15:6)
(Leningrad--Leather industry)

KHOKHLOV, O.N., inzh.

Mechanization of the finishing of armrests. Der.prom. 10 no.3:18-19 Mr '61. (MIRA 14:5)

1. Moskovskiy mebel'no-sborochnyy kombinat No. 2.
(Wood finishing)
(Furniture)

KHOKHLOV, R.

21(2) PHASE I BOOK EXPLOITATION SOV/2708

Atomnaya energiya i flot; sbornik statey (Atomic Energy and the Navy; Collection of Articles) Moscow, Voyenizdat, 1959. 252 p. (Series: Nauchno-populyarnaya biblioteka) Number of copies printed not given.

Ed.: Ya. M. Ender; Tech. Ed.: A.M. Gavrilova; Ed. and Compiler: L. D. Chernous'ko, Engineer, Captain.

PURPOSE: This book is intended for the general reader.

COVERAGE: The papers in this collection discuss in popular style, and on the basis of data published in the Soviet and non-Soviet press, problems of the use of atomic and hydrogen weapons in combat operations at sea. The collection includes reports on the damaging factors of a nuclear explosion and on the immense power of this weapon of mass destruction. A number of articles are devoted to the antinuclear defense of ships and of shore objects, and to the introduction of nuclear power plants in naval vessels. Also included in the collection are papers dealing with the future prospects for naval use of nuclear energy, and with the construction of the world's first atomic icebreaker, the "Lenin", which is expected to play an important part in the further conquest of the Arctic regions. The collection also contains papers published in the journal Sovetskiy flot in 1955 - 1958, in revised and supplemented form.

AVAILABLE: Library of Congress (UF767.C39)

KHOKHLOV, P.A.; ZORIN, F.A., otv. red.; OKHLOPKOV, Ye.D., red. izd-va.; PARSHIKOV, Ye.S., tekhn. red.

[Practices of efficiency experts in Aldan] Opyt ratsionalizatorov Aldana] IAkutsk, IAkutskoe knizhnoe izd-vo, 1958. 25 p. (MIRA 11:11)

1. Russia (1917- R.S.F.S.R.) Yakutskiy ekonomicheskiy administrativnyy rayon. Sovet narodnogo khozyaystva.
(Aldan--Gold mines and mining)

KHOKHLOV, P.A.; CHIKULAYEV, S.D.; PROKOP'YEV, V.D., otv. red.; OKHLOPKOV, Ye.D., red. izd-va; SOLOV'YEV, Ye.P., tekhn. red.

[Followers of Aleksandr Kol'chik in Aldan] Posledovateli Aleksandra Kol'chika na Aldane. IAkutsk, IAkutskoe knizhnoe izd-vo, 1959. 28 p. (MIRA 14:5)

1. Yakutsk (Province) Byuro tekhnicheskoy informatsii. (Aldan Plateau--Coal mines and mining)

KHOKHLOV, P.L., inzh.; DUBROV, V.S., inzh.; SLEPTSOV, N.I., inzh.; SAYAPIN, Yu.V.

Operation of water-cooler cupola furnaces. Stal' 22 no.3:286-287 Mr '62. (MIRA 15:3)

(Cupola furnaces—Cooling)

KHOKHLOV, P.M.

Stretching and drying chrome leather on frames. Leg.prom. 14 no.2: 22-25 F '54. (MLRA 7:5)
(Leather)

LYUBOMIRSKIY, G.S.; KHOKHLOV, P.M.

Improving the design of blades used in spacing machines. Obm.tekh. opyt. [MLP] no.26:32-34 '56. (MIRA 11:11)
(Cutting machines)

KHOKHLOV, P.M., kand.tekhn.nauk

Trawler fleet of the German Federal Republic [from foreign journals]. Sudostroenie 27 no.5:60-61 My '61. (MIRA 14:6)
(Germany, West—Trawls and trawling)

KHOKHLOV, P. P.

"Opyt primeneniya pomidornovo soka pri uporno nezazhivayushchikh yazvakh soleni i infitsirovanykh ranakh," Vrachebnoye delo, 1940, No 4.

Experimental use of Tomato juice in persistently unhealing ulcers of infected wound

KHOKHLOV, P. P.

Causes of late diagnosis of cancer of the stomach. Sovet. med., No. 7, July 50. p. 4-7

1. Of the Central Oncological Institute imeni P. A. Gertsen (Director--Prof. A. I. Savitskiy).

CIML 19, 5, Nov., 1950

St. Inst, Oncol

KHOKHLOV, P.P., professor.

Pneumatic bandage. Vest.khir.76 no.9:115-116 O '55.(MLRA 9:1)

1. Iz gospital'noy khirurgicheskoy kliniki (zav.-prof. P.P. Khokhlov) Karagandinskogo meditsinskogo instituta.
(BANDAGING AND DRESSING
pneumatic bandage after mastectomy)
(BREAST, surg.
mastectomy, postop.pneumatic bandage)

KHOKHLOV, P.P., professor; KARAMENDIN, I.I., kandidat meditsinskikh nauk

Ostheosynthesis by an "H" shaped bone nail. Zdrav.Kazakh.16 no.9: 38-39 '56. (MLRA 10:1)

1. Iz kafedry gospital'noy khirurgii (zav. kafedroy - prof. P.P. Khokhlov) Karagandinskogo gosudarstvennogo meditsinskogo instituta.
(FRACTURES)

KHOKHLOV, P.P., prof.; SHILYAYEVA, A.D.

Six years experience in using parietal preserved peritoneum of cattle in the treatment of thermal burns. Ortop.travm.i protez. 20 no.4:39-44 Ap '59. (MIRA 13:4)

1. Iz kliniki gospital'noy khirurgii (zav. - prof. P.P. Khokhlov) Karagandinskogo meditsinskogo instituta (dir. - dotsent P.M. Pospelov).

(BURNS, surg.
preserved parietal peritoneum from cattle in ther. of thermal burns (Rus))
(PERITONEUM, transpl.
same)

KHOKHLOV, P.P.; POPOV, P.Ya.

Surgical treatment of chronic hydrocele by the application of preserved parietal heterologous peritoneum. Urologiia 25 no.2: 21-24 Mr-Ap '60. (MIRA 13:12)
(HYDROCELE) (PERITONEUM--TRANSPLANTATION)

KHOKHLOV, P.S.

Dislocations of recent deposits and the possibility of using structural surveys in the central region of the Dnieper-Donets Lowland. Trudy VNIGNI no.1:230-238 '49. (MIRA 10:4)

(Dnieper Lowland--Geology--Surveys)
(Donets Basin--Geology--Surveys)

KHOKHLOV, Prokofiy Stepanovich; KUCHAPIN, Aleksandr Vasil'yevich, redaktor; PERMINOV, S.V., vedushchiy redaktor; GENNAD'YEV, S.V., tekhnicheskiy redaktor

[Tectonics and history of the formation of the Kerensk-Chembar and Sursk-Mokshinsk dislocation zone] Tektonika i istoriia formirovaniia zony Kerensko-Chembarskikh i Sursko-Mokshinskikh dislokatsii. Leningrad, Gos. nauchno-tekhn. izd-vo neftianoi i gorno-toplivnoi lit-ry, Leningradskoe otd-nie, 1955. 116 p. (MIRA 10:1)
(Russian Platform--Geology, Structural)

15-57-2-1474

Translation from: Referativnyy zhurnal, Geologiya, 1957, Nr 2, pp 43-44 (USSR)

AUTHOR: Khokhlov, P. S.

TITLE: The Development of Structures in the Sursk-Moksha Zone of Uplifts (K istorii razvitiya struktury Sursko-Mokshinskoy polosy podnyatiy)

PERIODICAL: Sov. geologiya, Nr 48, 1955, pp 184-190

ABSTRACT: The northeastern limb of the Surskoye-Moksha zone of uplifts dips at angles up to 17°. This zone is complicated in turn by local uplifts extending along a single line from the upper course of the Issa River on the southeast to the mouth of the Yulovo River. Two rising centers in the zone of uplifts, the Issa and the Berezenki, are situated on the north. The Kikino and Gusikha uplifts, situated 75 km southeast of the Berezenki structure, are a part of the Surskoye-Moksha

Card 1/2

zone; the steep eastern limb of the Kikino uplift (dipping at angles from 10° to 17°) joins with the steep limb of the Berezenki structure. Along the crest of the Surskoye-Moksha zone of uplifts, many breaks occur in the section. Thus, in the Tokmovo-Issa-Berezenki region, strata are missing for the Ryazhsk and Morsovskiy intervals, for the upper Famennian and the Tournaisian stages, and, in part, for the Tula coal-bearing deposits, the Namurian, and the lower Vereya intervals. A distinctive feature of the Sursk-Moksha zone of uplifts is that the depressions separating the individual uplifts gradually smooth out in lower horizons. The Surskoye-Moksha zone of uplifts became a distinct feature at the beginning of Moscovian time as a structural nose, corresponding in position to the northwestern part of the present zone; a flexure in the Issa-Lunino district formed at the beginning of the Cretaceous. The Sursk-Moksha and the Kikinskoye-Gusikhinskoye uplifts were united at the end of Albian time. The belt of uplifts continued to grow up to the beginning of the Neogene.

Card 2/2 Yu. A. K.

KHOKHLOV, P.S.

SUVOROV, P.G., [illegible]; [illegible]; [illegible]; [illegible];
NECHITAYLO, S.K.; MAKAROVA, [illegible]; [illegible]; [illegible];
IVANOVA, Z.P.; BURSHTAR, M.S.

Central provinces of the Russian Platform. Trudy VNIGRI no.101:171-248 '57. (MIRA 10:9)

(Russian Platform--Geology)

SAIDOV, M.N.,; KHOKHLOV, P.S.

Results of research carried out by the All-Union Petroleum Research Institute for Geological Surveying in 1957. Geol. nefti Supplement to no. 7:1-21 '58. (MIRA 11:8)

(Petroleum geology)
(Gas, Natural--Geology)

MECHITAYLO, S.K.; SUVOROV, P.G.; KHOKHLOV, P.S.

Basic geological characteristics, and oil and gas potentials of the central parts of the Russian Platform. Trudy VNIGNI no.10:142-157 '58.
(MIRA 14:5)

(Russian Platform -Petroleum geology)
(Russian Platform -Gas, Natural—Geology)

KHaKHLOV, P.S.

3(5) PHASE I BOOK EXPLOITATION SOV/2682

Vsesoyuznyy nauchno-issledovatel'skiy geologorazvedochnyy neftyanoy institut

Voprosy poiskov, razvedki i dobychi nefti i gaza na territorii USSR; doklady na vyyezdnoy sessii uchenykh sovetov VNIGNI i VNII, prokhodivshey v g. L'vove v maye 1957 g. (Problems in the Exploration and Production of Oil and Gas in the Ukrainian SSR; Reports Presented at a Session of the Scientific Councils of the All-Union Petroleum Scientific Research Institute for Geological Survey and the All-Union Scientific Research Institute, in L'vov, May 1957) Moscow, Gostoptekhizdat, 1959. 282 p. 1,000 copies printed.

Additional Sponsoring Agency: USSR. Ministerstvo geologii i okhrany nedr.

Eds.: I. G. Baranov, V. V. Glushko, and A. S. Murovtsev; Executive Eds.: S. N. Tungusov, and A. I. Zaretskaya; Tech Ed.: L. G. Fedotova.

PURPOSE: This book is intended for petroleum geologists and Ukrainian area specialists.

COVERAGE: This book contains 27 reports originally read at a meeting of the scientific councils of the VNIGNI (All-Union Petroleum Scientific Research Institute for Geological Survey), the VNII (All-Union Scientific Research Institute), the VNIIgaz, Ukrneft', Ukrgaz, Ukrvostoknefterazvedka, Ukrneftegazrazvedka, and Ukrneftegeofizika held in L'vov in May, 1957. The papers deal with the petroleum geology of the Dnepr-Donets depression, the Carpathians, Ciscarpathia, the southwestern fringe of the Russian Platform, and the northern Black Sea area. Particular attention is given to describing the geological features of those regions most likely to bear oil. Other articles discuss oil production techniques and ways of increasing drilling speed in deep wells. No personalities are mentioned. References accompany individual articles.

GASSANOVA, I.G., kurator; YELINA, L.M.; IL'INA, N.S.; KARASEV, M.S.; FEDASHENKO, A.I. [deceased]; FILIPPOVA, M.F. KHOKHLOV, P.S.

Kikino key well. Trudy VNIGNI no.26:227-307 '60. (MIRA 14:1)
(Russian Platform--Petroleum geology)

KHOKHLOV, P.S.

Geology, and oil and gas potentials of central areas of the Russian Platform. Geol.nefti i gaza 5 no.9:28-36 S '61. (MIRA 14:10)

1. Vsesoyuznyy nauchno-issledovatel'skiy geologorazvedochnyy neftyanoy institut.
(Russian Platform--Petroleum geology)
(Russian Platform--Gas, Natural--Geology)

L 14034-65 EWT(m)/EPF(c)/EWP(j) Pc-4/Pr-4 RM
ACCESSION NR: AP4048906 S/0286/64/000/020/0016/0016

AUTHOR: Khokhlov, P. S.; Bliznyuk, N. K.

TITLE: Preparative method for vinylphosphonic acid esters. Class 12, No 165726

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 20, 1964, 16

TOPIC TAGS: vinylphosphonic acid ester, vinylphosphonate, ch... ...ethylphosphonic acid ester, triethylamine, potassium b...

ABSTRACT: An Author Certificate has been issued for a method... paring vinylphosphonic acid esters by the reaction of ... ethyl)phosphonic acid esters with triethylamine in an organic ... vent. In order to raise the product yield, the reaction is conducted in the presence of hydrobromic acid salts, e.g., potassium ...

ASSOCIATION: none

SUBMITTED: 04Dec63 ENCL: 00 SUB CODE: GC, OC

NO REF SOV: 000 OTHER: 000 ATD PRESS: 3134

Card 1/1

ACC NR: AP6029024 SOURCE CODE: UR/0413/66/000/014/0024/0024

INVENTOR: Bliznyuk, N. K.; Kvasha, Z. N.; Khokhlov, P. S.; Libman, B. Ya.; Beym, A. I.; Vershinin, P. V.

ORG: none

TITLE: Preparation of S,S-dialkyl dithiochlorophosphates. Class 12, No. 183752

SOURCE: Izobret prom obraz tov zn, no. 14, 1966, 24

TOPIC TAGS: insecticide preparation, dibutyl dithiochlorophosphate, butyl mercaptan, mercaptan, chlorinated organic compound, phosphate, pyridine

ABSTRACT:

To increase the yield in the preparation of S,S-dialkyl dithiochlorophosphates, e.g., S,S-dibutyl dithiochlorophosphate, by the treatment of alkyl mercaptans (e.g., butyl mercaptan) and pyridine with phosphoryl chloride, the reaction is conducted in the presence of ammonium salts of substituted polythiophosphonic acids, e.g., ammonium phenyl dithiophosphonate.

SUB CODE: 07/ SUBM DATE: 24May65 [WA-50; CBE No. 11]

Card 1/1 UDC: 547.419.1.07

ACC NR: AP6030567 SOURCE CODE: UR/0413/66/000/016/0035/0035

INVENTOR: Bliznyuk, N. K.; Kvasha, Z. N.; Khokhlov, P. S.; Libman, B. Ya.; Vershinin, P. V.; Beym, A. I.; Mil'gotin, I. M.

ORG: none

TITLE: Preparation of S,S,S-trialkyl trithiophosphates. Class 12, No. 184864

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 16, 1966, 35

TOPIC TAGS: ~~trialkyl trithiophosphate preparation,~~ mercaptan, phosphoryl chloride, phosphate, chemical reaction, phosphorus chloride

ABSTRACT:
To simplify the technological preparation of S,S,S-trialkyl trithiophosphates by the reaction of mercaptans with phosphoryl chloride, the reaction is conducted in the presence of an ammonium salt of substituted polythiophosphoric or polythiophosphonic acids as catalysts.

SUB CODE: 07/ SUBM DATE: 24May65 [WA-50; CBE No. 11]

Card 1/1

ACC NR: AP6033452 SOURCE CODE: UR/0413/66/000/018/0038/0038

INVENTOR: Bliznyuk, N. K.; Khokhlov, P. S.

ORG: none

TITLE: Preparation of alkyl dichlorodithiophosphates. Class 12, No. 185902 [announced by All-Union Scientific Research Institute of Phytopathology (Vsesoyuznyy nauchno-issledovatel'skiy institut fitopatologii)]

SOURCE: Izobret prom obraz tov zn, no. 18, 1966, 38

TOPIC TAGS: alkyl dichlorodithiophosphate, phosphorus thiotrichloride, alkyl mercaptodichlorophosphate, alkyl thiodichlorophosphate, phosphate, organic phosphorus compound

ABSTRACT: To broaden the raw material base for the preparation of alkyl dichlorodithiophosphates from phosphorus thiotrichloride, in the proposed method the latter is heated with alkyl mercapto- or alkyl thiodichlorophosphates at 150—200°C under elevated pressures. [W.A. 50]

SUB CODE: 07/ SUBM DATE: 30Jun65

Card 1/1 UDC: 547.419.1.07

ACC NR: AP6033461 SOURCE CODE: UR/0413/66/000/018/0040/0040

INVENTOR: Bliznyuk, N. K.; Khokhlov, P. S.; Dotsev, G. V.

ORG: none

TITLE: Preparation of N-alkyl (N,N-dialkyl) hydrazides of dipentyloxyphosphoryl (thiophosphoryl)thioglycolic acid. Class 12, No. 185913

SOURCE: Izobret prom obraz tov zn, no. 18, 1966, 40

TOPIC TAGS: ~~dipentyloxyphosphoryl thioglycolic acid alkyl hydrazide~~
hydrazine, organic phosphorus compound, chloride

ABSTRACT: To simplify the process of the preparation of N-alkyl(N,N-dialkyl)hydrazides of dipentylphosphoryl(thiophosphoryl)thioglycolic acid, salts of dialkylthio(dithio)phosphorus acids are treated successively with chloroacetyl chloride and with the appropriate hydrazines. [W.A. 50]

SUB CODE: 07/ SUBM DATE: 14Dec64

Card 1/1 UDC: 547.419.1.07

ACC NR: AP6033460 SOURCE CODE: UR/0413/66/000/018/0040/0040

INVENTOR: Bliznyuk, N. K.; Khokhlov, P. S.

ORG: none

TITLE: Preparation of alkyl dichlorodithiophosphates. Class 12, No. 185912 [announced by All-Union Scientific Research Institute of Phytopathology (Vsesoyuznyy nauchno-issledovatel'skiy institut fitopatologii)]

SOURCE: Izobret prom obraz tov zn, no. 18, 1966, 40

TOPIC TAGS: alkyl dichlorodithiophosphate, phosphorus thiotrichloride, alkyl dichlorophosphate, phosphate, phosphorus chloride

ABSTRACT: To broaden the raw material base for the preparation of alkyl dichlorodithiophosphates from phosphorus thiotrichloride and phosphoric acid esters by heating the reaction mixture up to 150—200°C, alkyl dichlorophosphates are used instead of the esters of phosphorus acids. The process is carried out at elevated pressures. [W.A. 50]

SUB CODE: 07/ SUBM DATE: 05Jul65

Card 1/1 UDC: 547.26'118.07

ACC NR: AP6030566 SOURCE CODE: UR/0413/66/000/016/0034/0035

INVENTOR: Bliznyuk, N. K.; Khokhlov, P. S.; Dotsev, G. V.; Libman, B. Ya.; Beym, A. I.; Troitskiy, V. N.

ORG: none

TITLE: Preparation of acid chlorides of dithiophosphoric acid. Class 12, No. 184863

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 16, 1966, 34-35

TOPIC TAGS: dithiophosphoric acid chloride preparation, alkyl chlorodithiophosphate, aryl chlorodithiophosphate, alcohol, PHOSPHORIC ACID, CHLORIDE

ABSTRACT: In the proposed method, acid chlorides of dithiophosphoric acid

$$\begin{matrix}RO\\R'S\end{matrix}\!>\!\underset{\overset{\|}{S}}{PCl}$$

(where R and R' are an alkyl and an aryl) are obtained by treating alkyl(aryl) chlorodithiophosphates with alcohols or phenols. The reaction is carried out in organic solvents in the presence of an acceptor of HCl, e.g., tertiary amines. Orig. art. has: 1 formula. [WA-50; CBE No. 11]

SUB CODE: 07/ SUBM DATE: 25May65/

Card 1/1 UDC: 547.419.1'122'133-312.07

ACC NR: AP6029024 SOURCE CODE: UR/0413/66/000/014/0024/0024

INVENTOR: Bliznyuk, N. K.; Kvasha, Z. N.; Khokhlov, P. S.; Libman, B. Ya.; Beym, A. I.; Vershinin, P. V.

ORG: none

TITLE: Preparation of S,S-dialkyl dithiochlorophosphates. Class 12, No. 183752

SOURCE: Izobret prom obraz tov zn, no. 14, 1966, 24

TOPIC TAGS: insecticide preparation, dibutyl dithiochlorophosphate, butyl mercaptan, mercaptan, chlorinated organic compound, phosphate, pyridine

ABSTRACT:
To increase the yield in the preparation of S,S-dialkyl dithiochlorophosphates, e.g., S,S-dibutyl dithiochlorophosphate, by the treatment of alkyl mercaptans (e.g., butyl mercaptan) and pyridine with phosphoryl chloride, the reaction is conducted in the presence of ammonium salts of substituted polythiophosphonic acids, e.g., ammonium phenyl dithiophosphonate.

SUB CODE: 07/ SUBM DATE: 24May65 [WA-50; CBE No. 11]

Card 1/1 UDC: 547.419.1.07

ACC NR: AP7013151 SOURCE CODE: UR/0413/66/000/021/0040/0040

INVENTOR: Bliznyuk, N. K.; Khokhlov, P. S.; Libman, B. Ya.; Vershinin, P. V.; Beym, A. I.; Varshavskiy, S. L.

ORG: none

TITLE: Method for preparing alkyl(aryl)dithiodichlorophosphates, Class 12, no. 187785

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 21, 1966, 40

TOPIC TAGS: heterocyclic base compound, mercaptan, organic phosphate

SUB CODE: 07

ABSTRACT: A method is claimed for the preparation of alkyl(aryl)dithiodichlorophosphates, which differs in that for the purpose of extending the utilization of resources and increasing the yield of useful products, phosphorous thiotrichloride is subjected to reaction with mercaptans in the presence of catalytic quantities of heterocyclic bases, for example pyridine. [JPRS: 40,422]

Card 1/1

ACC NR: AP7013152 SOURCE CODE: UR/0413/66/000/021/0040/0041

INVENTOR: Bliznyuk, N. K.; Khokhlov, P. S.; Dotsev, G. V.

ORG: none

TITLE: Method for preparing alkylthiondichlorophosphates. Class 12, No. 187786

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 21, 1966, 40-41

TOPIC TAGS: acrylonitrile, phosphate, alcohol, organic phosphorus compound

SUB CODE: 07

ABSTRACT: A method is claimed for the preparation of alkylthiondichlorophosphates by reaction of phosphorus thiochloride with alcohols, differing in that for the purpose of obtaining higher alkylthionidichlorophosphates, the process is conducted in the presence of a hydrogen chloride acceptor, for example acrylonitrile. [JPRS: 40,422]

Card 1/1 UDC: 547.27'118.07

0933 0862

PA - 2406

AUTHOR: KHOKHLOV,P.T.

TITLE: Remelting of High Manganese Steel in the Open-Hearth Furnace. (Pereplav vysokomargantsovistoy stali v martenovskoy pechi,Russian).

PERIODICAL: Stal', 1957, Vol 17, Nr 2, pp 179 - 181 (U.S.S.R.)
Received: 5 / 1957 Reviewed: 5 / 1957

ABSTRACT: On the occasion of smelting high quality manganese steel a substantial loss of manganese has to be dealt with. Smelting can be carried out in three ways which are described here. Furthermore, a report is given of the method of charging with 100 % scrap-metal, which is used in this plant. A new technological method for the remelting of scrap-metal has been developed in accordance with proposals made by foreman Klyuchenko. A mixture of 4 shovels of 45 % ferrosilicon, 30 shovels of dry ground limestone, and 2 shovels of calcic fluoride are added to the charge in small portions within 30 minutes. After 30 minutes another mixture is added to the slag, which consists of 2 shovels of 45 % ferrosilicon, 5 - 6 shovels of pulverized coal and 20 shovels of limestone. The second mixture is added until the entire contents of the trough is molten. By this procedure high-quality-metal is obtained by the resmelting of 100 % scrap-metal. When applying this method correct handling of the slag is very important, as well as temperature control during the process of smelting and the corrections in the alloy, which have to be carried out according to the analyses made by the

Card 1/2

KHOKHLOV, P.V.; STAKHURSKIY, A.Ye., red.; ARKHAROVA, L.Ya., red.izd-va; VLASENKO, L.N., tekhn.red.

[How to sharpen tools] Kak tochit' instrumenty. Moskva, M-vo kul'tury RSFSR, Izd-vo "Detskii mir", 1960. (Prilozhenie k zhurnalu "IUnyi tekhnik" no.13(79)). (MIRA 14:1)

1. TSentral'naya stantsiya yunykh tekhnikov, Moscow.
(Toolroom practice)

33

PROCESSES AND PROPERTIES INDEX

Non-Stationary Processes in Waveguides. (In Russian.) R. V. Khokhlov. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), v. 61, Aug. 1, 1948, p. 637-640.

A mathematical analysis.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

KHOKLOV, R. V. 62/49T24

USSR/Electronics
Wave Guides Aug 49

"Spatial Pulsations in Connected Wave Guides," P. Ye. Krasnushkin, R. V. Khoklov, 12 pp

"Zhur Tekh Fiz" Vol XIX, No 8

Theoretically and experimentally investigates spatial pulsations in two semielliptical wave guides connected through a slot. Pulsations are due to the resolution, into doublets, of the natural waves in the isolated wave guides when a slot exists.

62/49T24

KHOKLOV, R. V.

PA 239T91

USSR/Mathematics - Asymptotic Expression 11 Aug 52

"An Asymptotic Expression for the Associated Laguerre Functions," R. V. Khokhlov

"DAN SSSR" Vol 85, No 5, pp 975-976

In a number of physics problems, for example in the quantum-mech study of the phenomenon of "luminous" electrons, interest is shown in the asymptotic expression for the assocd Laguerre functions $L_n^{\nu}(x)$, which is generally inapplicable in its usual trigonometrical form. In this report the author derives asymptotic expression which is convenient for certain

239T91

conditions of limitation on the value of x, namely, where the following expression is to be bounded: $\nu - 2(nx+x)^{\frac{1}{2}} - x$. Submitted by Acad V. A. Fok 16 Jun 52.

239T91

KHOKHLOV, R.V.

USSR/Physics - Self-Excited oscillations, synchronization FD-1203

Card 1/1 Pub. 129-6/19

Author : Khokhlov, R. V.

Title : Synchronization theory of self-excited oscillations on harmonics

Periodical : Vest. Mosk. un., Ser. fizikomat. i yest. nauk, 9, No. 5, 51-64, Aug 1954

Abstract : Theory of synchronization with external weak harmonic force of frequency close to an overtone of the system is analyzed. A reduced equation expressing the synchronization process at arbitrary amplitude of external force is derived and solved in the simplified case of low amplitude of the external force. The behavior of the system within and outside the synchronization range is analyzed. Eleven references.

Institution :

Submitted : March 9, 1954

Khokhlov, R.V.

USSR/Physics - Synchronization of self-excited oscillations FD-1601

Card 1/2 : Pub. 129-4/23

Author : Khokhlov, R. V.

Title : Theory of synchronization on undertones

Periodical : Vest. Mosk. un., Ser. fizikomat. i yest. nauk, 9, No 8, 33-43, Dec 1954

Abstract : The author presents the theory of synchronization of Thomson self-excited oscillatory systems of small harmonic external force on the undertone of the system. He introduces simplified equations describing the synchronization process, which are simplified for two cases: small external force and small external force together with "small" parameters of synchronization. He obtains expressions for the width of the zone of synchronization, for the phase between the forcing force and synchronized self-excited oscillation, for the amplitude within and outside of the zone of synchronization, and for the period of modulation outside. In the case of small parameters he finds a number of peculiarities; e.g. within the zone jumps in phase and in amplitude of self-excited oscillations are possible during variation of detuning, and the amplitude within the zone may have a complicated behavior characterizing several maxima and minima during change of detuning. He cites his earlier works (ibid. No 8, 1954; Doklady AN SSSR, 97, No 3, 1954). Five references (e.g. N. V. Butenin, Trudy LKVVIA (Works of Leningrad Red-Banner Airforce Engineering Academy), No 11, 1947; V. I. Siforov, Radiotekhnika, 1, No 5, 1946). Vest. Mosk. un., Ser. fizikomat. i yest. nauk, 9, No 8, 33-43, Dec 1954

KHOKHLOV, R. V.

USSR/Physics - Atomic physics

Card : 1/1

Authors : Khokhlov, R. V.

Title : Regarding the theory of catching by an external force at a small amplitude.

Periodical : Dokl. AN SSSR, 97, Ed. 3, 411 - 414, July, 1954

Abstract : Describes a method for solving problems dealing with small external sinusoidal forces catching self-oscillating systems of Thomson's type.

Institution : Moscow State University, im. M. V. Lomonosov

Presented by : N. N. Bogolyubov, Academician, April 1, 1954

B-83749, 4 Apr 55

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722130008-8"

KHOKHLOV, R. V.

"Development of a Method of Abbreviated Equations for Application to Problems of Synchronization," a paper ddlivered at the Section of Radiophysics, Physics Faculty, Conference on Radiophysics, Moscow State U., 10-14 May 55, Vest. Mosk. U., Ser. Fiz-Mat. i Yest. Nauk, No. 6, 1955

Sum. 900, 26 Apr 56

Khokhlov R. V.

4554 Theory of Self-Oscillations of a Reflex Klystron. **K teorii avtokolebanii v otrazhatel'nom klistrone.** (Russian.) R. V. Khokhlov. *Zhurnal tekhnicheskoi fiziki*, v. 25, no. 14, 1955, p. 2492-2500.

Self-oscillations of an insulated klystron and of one with resonator. Resonance curve, amplitude, and other characteristics of the self-oscillations. Graphs. 3 ref.

KHOKHLOV, R. V.

USSR / Radiophysics I

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 9883

Author : ~~Khokhlov, R.V.~~
Inst : Not given
Title : Certain Problems in the Theory of Synchronization of Self-Oscillating Systems.

Orig Pub : Tr. 3-vo. Vses. matem. s'yezda, T.1 M., AN SSSR, 1956, 226

Abstract : A brief summary of a paper, in which the author considers the method of analysis of "weak" synchronization of self-oscillating systems and certain resulta obtained by this method (Referat Zhurnal - Fizika, 1956, 4707, 14063, 35234, 35235).

Card : 1/1

VORONIN, Ye.S.; KHOKHLOV, R.V.

Synchronization of oscillators by radio pulses with sloping edges.
Radiotekh.i elektron. 1 no.1:79-87 Ja '56. (MIRA 9:11)
(Oscillators, Electric)

USSR/Radiophysics - General Problems, I-1

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 35234

Author: Khokhlov, R. V.

Institution: None

Title: Concerning One Case of Mutual Synchronization of Reflex Klystrons

Original Periodical: Radiotekhnika i elektronika, 1956, 1, No 1, 88-97

Abstract: Analysis of the process of interchanging the role of the locking and locked-in generators in a system, consisting of 2 coupled generators without time lag in the feedback circuit. It is shown that in the case when the frequency of the 2 generators are not the same, the frequency and amplitude of the fluctuations change abruptly. An equation is derived to describe the process of the mutual synchronization of 2 weekly-coupled reflex klystrons. Analysis of the mutual synchronization of a system of 2 klystrons shows that in this case it is possible to have a continuous transition from one state of the system, in which one klystron synchronizes the other, to a state in

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USSR/Radiophysics - General Problems, I-1

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 35235

Author: Khokhlov, R. V.

Institution: None

Title: On the Synchronization of Two Coupled Self-Oscillating Systems with an External Force

Original Periodical: Vestn. Mosk. un-ta., 1956, No 3, 41-49

Abstract: A theoretical investigation was made of the synchronization of 2 weakly-coupled self-excited generators by means of a small sinusoidal force. A system was considered, consisting of 2 inductively-coupled generators of the Thomson type with a tuned circuit in the grid circuits and with an external sinusoidal force applied to the tuned circuit of one of the systems. Equations are given, connecting the amplitude and the phases of the synchronized oscillations, and these equations are solved by expanding in terms of a small parameter, determined from the requirement that the band width of synchronization

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KHOKHLOV, R.V.

In the Department of Physics. Vest.Mosk.un.11 no.5:147-149 My '56.
(Physics--Research) (MLRA 9:10)

KHOKHLOV, R.V.

109-8-5/17

AUTHOR: Martynenko, D.P. and Khokhlov, R.V.

TITLE: The synchronization of an oscillator by an amplitude-modulated external source. (O zakhvatyvanii avtogeneratora amplitudno-modulirovannoy vneshney siloy)

PERIODICAL: Radiotekhnika i Elektronika, 1957, Vol.II, Nr 8, pp.1001 - 1011 (USSR)

ABSTRACT: The problem of synchronization of oscillators by amplitude-modulated signals is of some importance in certain technical problems (in particular, stabilization of special power oscillators) but it appears that it has been dealt with in only one paper (Ref.1). In this paper the author attempts to deal with the problem more accurately than was done in the above work. The system considered is that shown in Fig.2, that is, a tuned grid oscillator with the synchronizing source in its grid circuit. The process of synchronization can be described by the simplified Equations (1):

$$\dot{A} = \delta(A)\, A + \frac{E\,\omega_0}{2} \cos\varphi ,$$

$$\dot{\varphi} = \Delta - \frac{E\,\omega_0}{2A} \sin\varphi .$$

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109-8-6/17

The synchronization of an oscillator by an amplitude-modulated external source.

where A and φ are the amplitude and the phase of oscillations, Δ is the detuning between the frequency of oscillations ω_o and p, $\delta(A)$ is the mean damping coefficient of the system and E is the amplitude of the external source. E is expressed by equation 2:

$$E = E(t) = E_0 + e \cos \Omega t$$

where E_0 is the amplitude of the non-modulated external source, e is the amplitude of the modulated signal and $\Omega = 2\pi F$ is the angular modulation frequency. The above equations are investigated only for the case when the external source has a comparatively small amplitude. For this case the process of synchronization can be expressed by equation 3 :

$$\dot{\varphi} = \Delta - \frac{E(t)\omega_0}{2A_0} \sin \varphi$$

where A_0 is the amplitude of the free oscillations.

The amplitude of the forced oscillations A can be represented by :

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The synchronization of an oscillator by an amplitude-modulated external source.

$$A(t) = A_0 + \mu a(\mu t)$$

where μ is a small parameter, so that $a(t)$ is given by equation 4 :

$$a(t) = \frac{E(t)\omega_0}{2A_0 \left|\frac{d\,\mathcal{E}}{dA}\right|_{A=A_0}} \cos\varphi \,.$$

For the case of small detunings, the solution of equation 3 is given by equation 15 (p.1004) which gives the value of the phase in the steady state. Similarly, the amplitude of the forced oscillations is expressed by equation 16. For the case of low modulation frequencies, the phase in the steady state is given by equation 19. Equations 15 and 19 show that the synchronization of an oscillator by an amplitude-modulated signal leads to a phase modulation. When large detunings are considered, the phase equation leads to an expression of the Riccati type which can be transformed into an equation of the Mathieu type (see equation 27) whose solution is given by expression 28,

KHOKLOV, R.V.

56-5-26/55

AUTHOR KLIMONTOVICH, Yu.L., KHOKLOV, R.V.

TITLE On the Theory of the Molecular Generator.
(K teorii molekulyarnogo generatora - Russian)

PERIODICAL Zhurnal Eksperim.i Teoret.Fiziki, 1957, Vol 32, Nr 5, pp 1150-1155 (U.S.S.R.)

ABSTRACT According to the authors of the paper under review, the method employed by Basov and Prokhorov in their theoretical investigations is insufficient and renders the direct analysis of the complicated processes connected with the performance of a molecular generator more difficult. Therefore the present paper uses a more rigorous position of theproblem, on the basis of which the performance of the molecular generator is investigated in great detail. In this context, the authors first of all deal with the case where the molecules bundle has only one velocity ($v=v_0$), and then estimate the influence of the molecules with from v_0 differing velocities from a qualitative point of view. In the analysis of the performance of the molecular generator it is possible to limit oneself to the examination of only two energy states of the molecules which here are described as E_1 and E_2. For thesake of definiteness, $E_2 > E_1$ is assumed. The state of the molecules of the bundle in the resonator is described by a density matrix. The physical significance of the four matrix elements is given. The primary task is to find an expression for thepolarization P of the molecule bundle. In thepresent paper, this polarization $P(x,t)$ of the bundle is expressed by the solutions of a system of equations gi-

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On the Theory of the Molecular Generator. 56-5-26/55

ven in the paper. The authors investigated the solution of this system of equations for the case of oscillations that have become stationary, with the expression $E_0 \cos \omega t$ being adduced for the electrical field strength E. The explicit form of the solution, as obtained after several computations, is to be found in the paper. A small 'detuning' δ results in a resonance effect upon the molecule bundle: almost all molecules go over at the motion along the resonator either from the upper level to the lower level or vice versa. If the 'detuning' is large, only a small part of the molecules in the bundle participate in this transition. Then the polarization vector of the molecule bundle is computed, and the solution of the equation for the electric field strength is analyzed for the case of a bundle that is monochromatic with respect to the molecule velocity. Finally, the paper discusses the influence of some accidental factors on the stability of the performance of the molecule generator.
(2 reproductions).

ASSOCIATION Moscow State University

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SUBMITTED 29.6.1956

AVAILABLE Library of Congress.

Card 2/2

...KHLOV R.V.

SOV/162-58-3-11/26

8(5)

AUTHORS: Maneshin, N.K., and Khokhlov, R.V.

TITLE: The Mutual Synchronization of Two Loosely Coupled Molecular Generators (Vzaimnaya sinkhronizatsiya dvukh molekulyarnykh generatorov pri maloy svyazi)

PERIODICAL: Nauchnyye doklady vysshey shkoly, Radiotekhnika i elektronika, 1958, Nr 3, pp 74-83 (USSR)

ABSTRACT: The article is devoted to the theoretical analysis of the behaviour of two loosely coupled molecular generators within the range of synchronism and outside of it. The authors establish relation for the synchronization band width, which are suitable for practical evaluations. According to their calculations, jumps of the synchronous frequency may take place, when the frequency of both molecular generators is close to the frequency of the molecular transition into the system, if the parameters are changed within the synchronization band. There are 6

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SOV/141-1-5-6-8/28

AUTHORS: Khaldre, Kh.Yu. and Khokhlov, R.V.

TITLE: The Stability of Oscillation in a Molecular Oscillator

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1958, Vol 1, Nr 5-6, pp 60 - 65 (USSR)

ABSTRACT: Any investigation of the stability of molecular oscillations must be based on how the polarisation of a molecular beam varies in an alternating electric field of varying amplitude and phase. Suitable equations have been derived both in the work of A.V. Orayevskiy (Ref 5), V.S. Troitskiy (Ref 6) and G.N. Lyubimov and R.V. Khokhlov (Ref 4); the latter set is more complicated and will be the subject of another article; the former set is used here (1.1); they can be interpreted as representing two weakly damped oscillators with frequency of the resonator and of the molecular transition, respectively, which interact through a non-linear coupling of time constant τ. The method of Van der Pol is appropriate here, the field strength and the polarisation being represented as oscillations with slowly changing amplitude and phase, as in Eq (1.4). The stationary values of field amplitude E

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and oscillation frequency ω are given by Eq (1.8), corresponding values for the number of molecules leaving and entering the resonator are Eqs (1.9 and (1.10). The results of this simple derivation agree well with those derived in Ref 1 (N.G. Basov and A.M. Prokhorov) by more exact methods. The system equation is written most succinctly in (2.2). The conditions for stability of oscillations are Eq (2.3); these make no appeal to a physical understanding of the problem and an alternative method is proposed. The abbreviated equations describing the transient process are not homogeneous in the sense that the right-hand sides of the equation E and ϕ are in absolute magnitude significantly greater than the right-hand sides of those for P and N. The physical meaning is that the steady state is reached rapidly in the E, ϕ co-ordinates and slowly in the P, N co-ordinates. The stability of each of the subordinate processes may now be confirmed separately from the respective conditions (2.8) and (2.9). In the work of Troitskiy (Ref 6), evidence

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The Stability of Oscillation in a Molecular Oscillator

of some instability was found but that analysis assumed quasi-statistical values for P and N . The last section of the paper examines the stability criteria more closely, taking into account the relative orders of smallness of magnitude in Eq (2.2). There are 8 references, of which 7 are Soviet and 1 English.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: March 1, 1958

Card 3/3

SOV-109-3-4-6/28

AUTHORS: Rayevskiy, S. Ya. and Khokhlov, R. V.

TITLE: Synchronisation of an Oscillator by a Sinusoidal Signal in the Presence of the Fluctuation Noise (O sinkhronizatsii avtogeneratora sinusoidal'noy siloy pri nalichii fluktuatsionnykh pomekh)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol 3, Nr 4, pp 507-511 (USSR)

ABSTRACT: The problem is formulated as follows: an oscillator is subjectedto the action of an external sinusoidal signal mixed with a random noise which can be regarded as a stationary random process. The oscillator is assumed to have a high quality resonant circuit, so that its bandwidth is expressed by:

$$\Omega = \frac{\omega}{Q} \quad (1)$$

, where Q is the quality factor of the system and ω is the oscillation frequency. The synchronising voltage can be expressed by Eq.(2) in which E_0 and p are the amplitude and the

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SOV-109-3-4-6/28

Synchronisation of an Oscillator by a Sinusoidal Signal in the Presence of the Fluctuation Noise

frequency of the external signal respectively and e_1 and e_2 are two comparatively slowly changing random functions. The basic equation of the system is given by Eq.(3). If it is assumed that the oscillator is of the tuned-grid type and that the oscillation voltage is expressed by Eq.(4), the synchronisation can be described by Eqs.(5) where A and φ are the amplitude and the phase of the oscillations and $\Delta = \omega - p$ is the detuning of the system. If the amplitude of the external signal is small, the oscillation amplitude can be expressed by Eq.(6) in which μ is a small parameter. Consequently, the amplitude deviation of the system can be described by Eq.(7). For $\sin \varphi \simeq \varphi$ and $\cos \varphi \simeq 1$, the phase equation of the system can be written as Eq.(9) and its steady state solution as Eq.(10). The integral given by Eq.(10) can approximately be written as Eq.(11) in which the second term is expressed by Eq.(12). The above approximation is true for $z_0 \ll 1$; this condition can also be written as Eq.(14), in which N is the spectral density of the random signal in the bandwidth Ω. Eq.(14) is the necessary and sufficient condition for the synchronisation

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Synchronisation of an Oscillator by a Sinusoidal Signal in the Presence of the Fluctuation Noise

of the system, that is, for ensuring that the amplitude and phase deviations are small. If this condition is not fulfilled, there is no synchronisation, or the synchronisation becomes spurious. There are 2 figures, 3 Soviet references and 1 English.

SUBMITTED: November 23, 1956

1. Oscillators--Synchronization 2. Mathematics--Applications

Card 3/3

SOV-109-3-4-19/28

AUTHOR: Khokhlov, R. V.

TITLE: The Pull-In of a Molecular (Maser) Oscillator by a Small External Signal (O zakhvatyvanii molekulyarnogo generatora maloy vneshney siloy)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol 3, Nr 4, pp 566-568 (USSR)

ABSTRACT: It is assumed that the process of synchronisation of a molecular oscillator can be described by Eq.(1), where E is the field in the resonator, Q is the quality factor of the resonator, ω_1 is the frequency of the resonator, ω_0 is the frequency of a molecular transition and P is the polarisation of the molecular beam. If the field is

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SOV-109-3-4-19/28

The Pull-In of a Molecular (Maser) Oscillator by a Small External Signal

given by Eq.(2), Eq.(1) can be split into amplitude and phase components as given by Eqs.(3); various parameters of Eqs.(3) are defined by Eqs.(4) and (5). If the external synchronising force is very small, the parameters P can be described by Eq.(6), where Ω is given by Eq.(7). For the above conditions the phase transient of the oscillator can be expressed by Eqs.(12) (and 13) and the pull-in bandwidth by Eq.(14). On the other hand, the amplitude deviation a as defined by Eq.(8), can be expressed by Eq.(19), where N and ψ are given by Eqs.(20). There are 5 references, 4 of which are Soviet and 1 English.

SUBMITTED: April 16, 1957

1. Oscillators--Mathematical analysis

Card 2/2

AUTHORS: Khaldre, Kh.Yu., and Khokhlov, R.V. SOV/55-58-1-20/33

TITLE: On Higher Spectral Components in a Molecular Generator (O vysshikh spektral'nykh komponentakh kolebaniy v molekulyarnom generatore)

PERIODICAL: Vestnik Moskovskogo universiteta, Seriya fiziko-matematicheskikh i yestestvennykh nauk, 1958, Vol 13, Nr 1, pp 157-162 (USSR)

ABSTRACT: The authors consider the new molecular generator described in [Ref 1] and [Ref 2], the phugoid motions of which are described by a non-linear equation of second order. In the first approximation, besides of the first harmonic the next one (third one) is determined, where it appears that the amplitude of this third harmonic has the order 10^{-16} in comparison to the amplitude of the first harmonic. It is shown that this third harmonic is the greatest of the higher harmonics, but it remains unanswered whether the sum of the fifth, seventh etc. harmonic perhaps has an essential influence.
There are 3 Soviet references.

ASSOCIATION: Kafedra kolebaniy (Chair of Oscillations)

SUBMITTED: April 27, 1957

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9(2)

AUTHORS: Maneshin, N.K. and Khokhlov, R.V. SOV/55-58-2-14/35

TITLE: Coverage Band Width of Molecular Generator Under the Effect of a Large External Force (O zakhvatyvanii molekulyarnogo generatora bol'shoy vneshney siloy)

PERIODICAL: Vestnik Moskovskogo Universiteta, Seriya matematiki, mekhaniki, astronomii, fiziki, khimii, 1958, Nr 2, pp 109-114 (USSR)

ABSTRACT: The molecular generator developed in recent years is often applied as a source of oscillations which are very stable in frequency. Its phugoid motions, in particular the behavior of oscillation during the interference of an external force, however, are little known, since the investigations are connected with great mathematical difficulties. For large amplitudes of the external force the process of the drift is connected with asynchronous cancellation of the phugoid motions by the forced oscillations, whereby the amplitude of these oscillations increases with the approximation of the frequency of the external force to the frequency of the phugoid motion. By approximation of the total process and by averaging the occurring magnitudes the authors obtain some at least qualitatively interesting expressions and then in-

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Coverage Band Width of Molecular Generator Under the Effect of a Large External Force SOV/55-58-2-14/35

vestigate the stability of the obtained approximative solutions. It is stated that for certain characteristic values there takes place a self-excitation of the phugoid motions so that the process is a pulsation between the forced oscillations and the phugoid motions. An estimation of the coverage band width is given.
There are 3 figures, and 3 Soviet references.

ASSOCIATION: Kafedra kolebaniy (Chair of Oscillations) [Moscow Univ.]

SUBMITTED: June 10, 1957

Card 2/2

9(4)

AUTHORS: Irisov, Ye.A. and Khokhlov, R.V. SOV/55-58-2-18/35

TITLE: On an Autogenerator Loosely Coupled to a High-Q Circuit (Ob avtogeneratore, slabo svyazannom s vysokodobrotnym konturom)

PERIODICAL: Vestnik Moskovskogo Universiteta, Seriya matematiki, mekhaniki, astronomii, fiziki, khimii, 1958, Nr 2, pp 137-143 (USSR)

ABSTRACT: The behavior of an autogenerator loaded by a circuit is described by a system of equations which cannot be solved in the general case. For the determination of the phugoid motions of the considered system the authors propose a method which can be applied, if the connection (in the sense of Metropol'skiy) between the circuits is weak and, if the external circuit (loading the generator) is of essentially higher quality than the internal circuit. Under these suppositions the general system changes into a system possessing small parameters for the derivatives and which can be solved according to the methods of A.N. Tikhonov, I.S. Gradshteyn, L.S. Pontryagin etc.
The first investigations of phugoid motions of the considered systems are due to S.M. Rytov, A.M. Prokhorov, M.Ye. Zhabotinskiy [Ref 1] and Yu.B. Kobzarev [Ref 2].

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On an Autogenerator Loosely Coupled to a High-Q Circuit SOV/55-58-2-18/35

There are 2 figures, and 8 Soviet references.

ASSOCIATION: Kafedra teorii kolebaniy (Chair of Oscillation Theory) [Moscow Univ.]

SUBMITTED: June 26, 1957

Card 2/2

BENDRIKOV, G.A.; KRASNUSHKIN, P.Ye.; REYKHRUDEL', E.M.; POTEMKIN, V.V.; NUSTEL', Ye.R.; RZHEVKIN, K.S.; IVANOV, I.V.; KHARLAMOV, A.A.; TIKHONOV, Yu.V.; STRELKOVA, L.P.; KAPTSOV, L.N.; ORDANOVICH, A.Ye.; KHOKHLOV, R.V.; VORONIN, E.S.; BERESTOVSKIY, G.N.; KRASNOPEVTSEV, Yu.V.; MINAKOVA, I.I.; YASTREBTSEVA, T.N.; SEMENOV, A.A.; VINOGRADOVA, M.B.; KARPEYEV, G.A.; DRACHEV, L.A.; TROFIMOVA, N.B.; SIZOV, V.P.; RZHEVKIN, S.N.; VELIZHANINA, K.A.; NESTEROV, V.S.; SPIVAK, G.V., red.; NOSYREVA, I.A., red.; GEORGIYEVA, G.I., tekhn. red.

[Special physics practicum] Spetsiel'nyi fizicheskii praktikum. Moskva, Izd-vo Mosk.univ. Vol.1. [Radio physics and electronics] Radiofizika i elektronika. Sost. pod red. G.V.Spivaka. 1960. 600 p.

(MIRA 13:6)

1. Professorsko-prepodavatel'skiy kollektiv fizicheskogo fakul'teta Moskovskogo universiteta im. M.V.Lomonosova (for all except Spivak, Nosyreva, Georgiyeva).
(Radio) (Electronics)

KHOKHLOV, R.V.

27612

S/141/61/004/002/004/017
E032/E314

AUTHORS: Mukhamedgaliyeva, A.F. and Khokhlov, R.V.

TITLE: On the Stability of Oscillations in a Molecular Generator (Maser)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1961, Vol. 4, No. 2, pp. 259 - 262

TEXT: The theory of a maser can be set up with the aid of the polarisation function P defining the density function D. These two functions are defined by

$$P(x, t) = p\,(e^{i\omega_0 t} C_{12} + e^{-i\omega_0 t} C_{21});$$
$$D(x, t) = C_{22} - C_{11},$$

where $C_{ik}(x, t)$ are the elements of the density matrix,
p is the dipole moment and
ω_0 is the transition frequency.

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On the Stability of S/141/61/004/002/004/017
E032/E314

When a field of the form $\varepsilon = E(t)\cos\left[\omega_0 t + \varphi(t)\right]$ is applied, the approximate expressions for P and D are shown by Lyubimov and Khokhlov (Ref. 8) to be of the form

$$\frac{\partial D}{\partial \eta} = \frac{1}{2hv} E(\eta) P_1;$$
$$\frac{\partial P_1}{\partial \eta} = \varphi'(\eta) P_2 - \frac{p^2}{2hv} E(\eta) D; \qquad (1)$$
$$\frac{\partial P_2}{\partial \eta} = \varphi'(\eta) P_1$$

These are subject to the boundary conditions $D = B(v)$, $P_1 = P_2 = 0$ when $\eta = -\zeta$ and $\zeta = x - vt$, $\eta = x + vt$ and P_1 and P_2 are the active and reactive components of the polarisation. In addition to the set of equations (1),

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non-stationary processes are described by a further two differential equations for slowly varying field amplitudes and phases. However, in most cases, these differential equations can be approximately reduced to the algebraic equations

$$-(\omega_o/2Q)E - 2\pi\omega_o\bar{P}_1 = 0; \quad \Delta - 2\pi\omega_o\bar{P}_2/E = 0 \qquad (2)$$

where $\Delta = \omega_{res} - \omega_o$ and P_1 and P_2 are averaged over x and over v . Substituting Eq. (2) into Eq. (1), one obtains a set of three integro-differential equations. These equations are then applied to the case of a beam of molecules, all having the same velocity. In the neighbourhood of the steady state

$$E(t) = E_o + \varepsilon e^{\lambda t}; \quad \delta = \dot{\varphi}(t) = \delta_o + \vartheta e^{\lambda t}$$

where ε and ϑ are first-order quantities, as compared

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On the Stability of ....

with steady-state values of E_0 and δ_0. The polarisation functions can be written down in the form

$$P_1 = P_1^o + p_1 e^{\lambda t}; \quad P_2 = P_2^o + p_2 e^{\lambda t},$$

where p_1 and p_2 are small deviations from the steady state. It can be shown that ε and ϑ are given by

$$\varepsilon = -4\pi Q\bar{p}; \quad \theta = \frac{\omega_0}{2Q}\frac{1}{\bar{P}_1^{o2}}(\bar{P}_1^0\bar{p}_2 - \bar{P}_2^0\bar{p}_1).$$

The set of equations has a non-trivial solution when the corresponding determinant is equal to zero, in which case we have the following equation in $\Lambda = \lambda/2v$

$$Y_5\Lambda^5 + Y_4\Lambda^4 + Y_3\Lambda^3 + Y_2\Lambda^2 + Y_1\Lambda + Y_0 +$$
$$+ e^{-2\Lambda L}(y_3\Lambda^3 + y_2\Lambda^2 + y_1\Lambda + y_0) + e^{-4\Lambda L}(z_1\Lambda + z_0) = 0,$$

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where Y_n, y_n and z_n are functions of E_0, δ_0, ε and ϑ.
A positive root is obtained when

$$[Y_5\Lambda^5 + Y_4\Lambda^4 + Y_3\Lambda^3 + Y_2\Lambda^2 + Y_1\Lambda + Y_0 + e^{-4\Lambda L}(z_1\Lambda + z_0)]'' >$$
$$> [e^{-2\Lambda L}(y_3\Lambda^3 + y_2\Lambda^2 + y_1\Lambda + y_0)]''.$$

This inequality can be used to establish the boundaries of the instability region. This analysis is then extended in a qualitative way to the case when there is a velocity distribution. It is concluded that if this velocity spread in the molecular beam is not large, then there are regions of parameter values in which instability sets in. The instability disappears in the case of a large velocity spread. There are 2 figures and 8 Soviet references.

4

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E032/E314

On the Stability of ....

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: September 29, 1959

4

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24463

S/109/61/006/006/004/016
D204/D303

9.1400

AUTHOR: Khokhlov, R.V.

TITLE: Theory of shock radio waves in non-linear transmission lines

PERIODICAL: Radiotekhnika i elektronika, v. 6, no. 6, 1961, 917 - 925

TEXT: The author gives the analysis of wave propagation in slightly non-linear and little energy absorbing media which do not exhibit any dispersing properties at all. The analysis is carried out using an approximate method which actually is a generalized method of solving systems of equations with partial derivatives. In the present article the process of propagation is analyzed for the case of a transmission line, in which the non-linear parameter is the distributed capacitance. It is shown that, irrespective of the shape of the periodic voltage at the input of such a system, the shape of the propagated wave becomes distorted, becoming even-

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Theory of shock radio ... S/109/61/006/006/004/016
D204/D303

tually a saw tooth wave. This is done by analysing graphically the inverse function of the input voltage at $z = 0$, $u = u_0 \sin \omega t$, as given by

$$\omega\tau = U_0 \frac{\alpha\omega}{\delta} (1 - e^{-\delta x}) \frac{Ue^{\delta x}}{U_0} + \arcsin \frac{Ue^{\delta x}}{U_0} \qquad (18)$$

and using graphic representation of Fig. 2. Eq. (18) can be represented as a sum of two functions: $\sin^{-1}$ and that of a straight line with the coefficient Z as given by

$$Z = \frac{\omega\alpha U_0}{\delta} (1 - e^{-\delta x}). \qquad (19)$$

Neglecting this part of the losses which increases with frequency (such as due to distributed resistance in series with the capacitance), the distortion of the input wave form will depend on the reduced distance Z (Eq. 19). With diminishing input amplitude the distance, at which a discontinuity in the wave profile appears, in-

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creases and becomes infinitely great for at a certain critical value of input amplitude $U_{cr} = \frac{\delta}{\omega\alpha}$. It may be seen from Eq. (19) that, irrespective of whether the transmission line is lossless or not, the wave energy is being dissipated. The minimum duration of the quasi-discontinuity of the wave form is obtained at distances the order of magnitude of which is given by

$$\gamma x \simeq \frac{C}{DU_0} \frac{\pi}{2} \tag{41}$$

which corresponds to a phase interval $(\omega\tau)$:

$$[\omega\tau] = 2 \frac{1}{Q_0} \left(\frac{C}{DU_0}\right). \tag{42}$$

This equation gives also the highest order of harmonic which can be obtained in the system and is determined by the product of the storage factor Q_0 and the parameter of non-linearity (the coeffi-

cient of capacitance modulation) D. The author expresses his thanks to Professor G. Hefner of Stanford University, USA for interesting discussions. There are 4 figures and 9 references: 5 Soviet-bloc and 4 non-Soviet-bloc. The references to the English-language publications read as follows: R. Landauer, Parametric amplification along non-linear transmission lines, J. Appl. Phys., 1960, 31, 3, 478; G.M. Roe, M.R. Boyd, Parametric energy conversion in distributed systems, Proc. I.R.E., 1959, 47, 7, 1213; E. Hopf, The partial differential equation $U_t + UU_x = \mu U_{xx}$, Communs Pure and Appl. Maths, 1950, 3, 3, 201; J.D. Cole, Quasi-linear parabolic equation occurring in aerodynamic, Quart. Appl. Maths., 1951, 9, 3, 225.

SUBMITTED: August 24, 1960

24870 S/109/61/006/007/010/020
D262/D306

9.2572
9.7140

AUTHOR: Khokhlov, R.V.

TITLE: Propagation of waves in non-linear dispersion lines

PERIODICAL: Radiotekhnika i elektronika, v. 6, no. 7, 1961, 1116 - 1127

TEXT: In the analysis of wave propagation lines with non-linearly distributed parameters which can be used for frequency multiplication two limiting cases arise: that of a strongly dispersing and of a dispersionless line. When dispersion is present only a few harmonics of the signal have the velocity of propagation equal to that of the fundamental. The interaction exists, therefore, between these harmonics and the fundamental which results in the beat of energy. The author considers analytically in the present article such a process for the simple case when only one, namely the second harmonic of the signal, has the phase velocity of propagation very nearly equal to the velocity of propagation of the fundamen-

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tal component. It is pointed out as a matter of interest that such a case is in fact a space-time analogue of the process of parametric interaction between two types of oscillations of a pendulum as analyzed some time ago by A.A. Vitt and G.S. Gorelik (Ref. 7: Kolebaniya uprugogo mayatnika kakprimer kolebaniy dvukh parametricheskikh lineynykh sistem, ZhTF, 1933, 3, 2-3, 294). Basic equations are first derived for a line with small non-linearities, in which the non-linear parameter is the distributed capacitance.

$$\dot{U}_1 + \beta_1 U_1 U_2 \sin\Phi + \delta_1 U_1 = 0, \quad 2\dot{\varphi}_1 + \frac{\Delta}{2} + 2\beta_1 U_2 \cos\Phi = 0, \tag{6}$$

$$\dot{U}_2 - \beta_2 U_1^2 \sin\Phi + \delta_2 U_2 = 0, \quad \dot{\varphi}_2 - \frac{\Delta}{2} + \beta_2 \frac{U_1^2}{U_2} \cos\Phi = 0$$

and

$$\dot{\Phi} + \Delta + \left[2\beta_1 U_2 - \beta_2 \frac{U_1^2}{U_2}\right] \cos\Phi = 0. \tag{10}$$

describe fully the process of propagation in a dispersing transmission line when interaction between the fundamental and the second harmonic only exists. Eq. (6) cannot be solved as such. Nevertheless, the analysis of the process can be made by considering certain limiting cases. When no attenuation is present in the system Eqs. (6) and (10) can be integrated in a phase plane. New variables are introduced leading to

$$\frac{dx}{dy}=\frac{\beta_1 U_0^2+\Delta y-\beta_1 x^2-3\beta_1 y^2}{x(2\beta_1 y-\Delta)}. \qquad (15)$$

using this equation and studying the properties of its singular points, curves of integral can be drawn for various ratios of parameters. For $\Delta = 0$ all energy of the second harmonic transform into the energy of the fundamental and back, i.e. full beats exist. When $/\Delta/ < 2\beta_1 U_0$ there exists within the system two steady states. When $\Delta = 0$ in both synchronous states the transformed power is

$$\beta_2 U_1^2 = 2\beta_1 U_2^2. \qquad (18)$$

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Thus from the analysis of the phase picture on xy plane many properties and peculiarities of the system can be determined. Some integral trajectories are analyzed theoretically for limiting trajectories. The above are related to a system without attenuation. The general case with different attenuation factors δ_1 and δ_2 and their varying ratio with respect to coupling coefficients β_1 and β_2 can be analyzed only by numerical interpretation of Eqs. (6) and (10). It can be said that in case of different attenuation factors, the attenuation shows little at distances of the order of one beat period. Since in practical cases the attenuation at harmonic frequencies is greater than that of fundamental frequencies it is of interest to analyze the case when the attenuation factor is large; i.e.

$$\delta_2 \gg \beta_{1,2} U_0 \qquad (44)$$

the factor δ_1 being small and of the order of magnitude of the RHS of (44). Integrating,

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$$\frac{dx}{dw} = \frac{\delta_2 x - \beta_2 w}{2w(\delta_1 - \beta_1 x)} \qquad (47)$$

is obtained and in approximation the expression of this integral curve is given by

$$y \cong \frac{\beta_2}{\delta_2} w. \qquad (48)$$

from the analysis of which it may be seen that all possible excitation of the wave field occur at distances from the input being of the order $1/\delta_2$, after which distance the amplitudes reduce slowly at a rate of $1/2\delta_1$. The fact that two stationary states are present can be utilized for developing new memory elements for high speed computers. There are 4 figures and 8 references: 5 Soviet-bloc and 3 non-Soviet-bloc. The references to the English-language publications read as follows: P.K. Tien, H. Suhl, A travelling

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wave ferromagnetic amplifier Proc. I.R.E. 1958, 46, 4, 700; P.K. Tien. Parametric amplification and frequency mixing in propagation circuits, J. Appl. Phys., 1958, 29, 9, 1347; A.L. Cullen, Theory of travelling wave parametric amplifier. Nature, 1958, 181, 332, Proc. I.E.E. 1960, 10713, 32, 101.

SUBMITTED: August 15, 1960

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9,2580 (1159,1163,1040)

29307
S/109/61/006/0[illegible]0/00[illegible]/027
D201/D302

AUTHORS: Grigor'yev, Yu.V., and Khokh[illegible]ov, R.V.

TITLE: An oscillator parametrically coupled to a linear network

PERIODICAL: Radiotekhnika i elektronika, v. 6, no. 10, 1961, 1617 - 1624

TEXT: A.N. Charakhch'yan (Ref. 6: ZhTF, 1936, 6, 7, 1230) investigated the parametric excitation of oscillations, at which the emf's of an external given amplitude and phase were applied to a resonance amplifier, parametrically coupled to a linear network. In the present article the regeneration introduced by the parametrically excited network into the generator is considered, the changes of the parameter being made directly not by intermediary of an amplifier, but by the oscillator itself. The analysis is carried out from the behavior of a self oscillating system with two parametrically coupled, degrees of freedom as shown in Fig. 1, in which the parametric coupling is achieved by the use of ferrite toroids. For

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The cct in Fig. 1 the harmonic approximation of the solution of the system equations is obtained, from which the expression for the frequency of oscillations for loose coupling is obtained as

$$(\nu_2 - \frac{\omega}{2})^2 \left[1 - \frac{2\delta_2}{\delta_0} - \frac{\delta_2^2}{q^2} - \frac{(\nu_2 - \frac{\omega}{2})^2}{q^2}\right]^2 - \left(\frac{2\delta_2}{\delta_0}\right)^2 \Delta^2 = 0$$

together with the equation for 'resonance' curves

$$\eta^2 = \left(1 - \frac{\delta_2^2}{q^2} - y\right)\left(\frac{2\delta_2}{\delta_0} - y\right)^2 \qquad (4)$$

where $q = [(A_0/4)m\nu_1^2]$,

$$\eta^2 = \left(\frac{2\delta_2}{\delta_0}\right)^2 \frac{\Delta^2}{q^2}; \qquad y = 2\,\frac{2\delta_2}{\delta_0}\,\frac{B^2}{A^2} = 1 - \frac{A^2}{A_0^2},$$

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$m = \frac{2\gamma}{L_0}$; $\xi = \nu_1\nu_2$; $\nu_1^2 = \frac{1}{L_0 C_1}$; $L_0 = L + 2\beta$; A_0 - amplitude of oscillations of loaded oscillator; $\Delta = \nu_2 - \nu_1/2$; all other symbols are the ones usually used. The stability of the system is evaluated from the Lyapunov method. For weak regenerative coupling they take the shape of

$$y < \frac{1}{2}\left(1 + \frac{\delta_2}{\delta_0}\right),$$

$$y^4 - \left(1{,}5 - 2\frac{\delta_2}{\delta_0} + 2\frac{\delta_2^2}{q^2}\right)y^3 + \left(0{,}5 - 3\frac{\delta_2}{\delta_0} + 3\frac{\delta_2^2}{q^2} + 8\frac{\delta_2}{\delta_0}\frac{\delta_2^2}{q^2} - \frac{\delta_2^2}{\delta_0^2}\right)y^2 + \left(\frac{\delta_2}{\delta_0} - \frac{\delta_2^2}{q^2} - 8\frac{\delta_2}{\delta_0}\frac{\delta_2^2}{q^2} - 4\frac{\delta_2^2}{\delta_0^2}\frac{\delta_2^2}{q^2} + \frac{\delta_2^2}{\delta_0^2}\right)y + 2\frac{\delta_2}{\delta_0}\frac{\delta_2^2}{q^2}\left(1 + \frac{\delta_2}{\delta_0}\right) > 0, \quad 5\ \cancel{(6)} \qquad (5)$$

$$y < \frac{2}{3}\left(1 + \frac{\delta_2}{\delta_0} - \frac{\delta_2^2}{q^2}\right).$$

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Equation $y < \frac{1}{2}\left(1 + \frac{\delta_2}{\delta_0}\right)$ is called the amplitude stability condition, equation (5) the composite stability and $y < \frac{2}{3}\left(1 + \frac{\delta_2}{\delta_0} - \frac{\delta_2^2}{q^2}\right)$ the frequency stability condition; they are analyzed as boundaries between the domains of stable and unstable states on the plane of resonance curves. The equation for the stability limit of the composite condition is thus obtained as

$$\eta^2 = \frac{3(y-1)\left(y-\frac{2}{3}\right)\left[(y-0,5)\left(y-\frac{2\delta_2}{\delta_0}\right)+\frac{\delta_2^2}{\delta_0^2}\right]}{(y-0,5)\left[-2y(y-1)+8\frac{\delta_2}{\delta_0}(y-0,5)-4\frac{\delta_2^2}{\delta_q^2}\right]}\left(\frac{2\delta_2}{\delta_0}-y\right)^2 \qquad (6)$$

and the same for the frequency condition as

$$\eta^2 = \frac{1}{2}\left(y - \frac{2\delta_2}{\delta_0}\right)^3. \qquad (7)$$

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R000722130008-8"

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The boundary of the amplitude stability condition is a straight line intersecting the boundary of frequency conditions when $2\delta_2/\delta_0 < 2/3$. The stability of the oscillator has also been considered as a function of the loading: slight, medium and heavy. For a medium loading of the oscillator at $1 - \frac{2\delta_2}{\delta_0} \leqslant \frac{\delta_2^2}{q^2} \geqslant \frac{1}{4}\left(1 + \frac{\delta_2}{\delta_0}\right)$, the jump of frequency and amplitude with a changed tuning of partial frequencies for instance, takes place at the points of frequency and amplitude curves, at which the tangent to these curves is vertical. When the loading is weak, there is a closed loop of the boundary loop and this results in that with $1 - \frac{2\delta_2}{\delta_0} > \frac{\delta_2^2}{q^2} \geqslant \frac{1}{4}\left(1 + \frac{\delta_2}{\delta_0}\right)$, the points with vertical tangents can be reached only for δ_2^2/q^2, somewhat smaller than $1 - \frac{2\delta_2}{\delta_0}$ and for δ_2^2/q^2, only slightly larger than

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$\frac{1}{4}(1 + \frac{\delta_2}{\delta_0})$; when the loading is heavy only those of single valued amplitude and frequency curves can be stable for which $\delta_2^2/q^2 > 1/3$. 4 Experiments carried out have proved that in this case the oscillations have a self-modulating character and become intermittent for zero detuning. The experiments also proved that the theory as given above is qualitatively correct in describing the behavior of self-oscillating systems with two parametrically related degrees of freedom. The authors acknowledge the helpfull assessment of the obtained results by K.F. Teodorchik. There are 10 figures and 7 Soviet-bloc references.

SUBMITTED: January 31, 1961

Card 6/1 6

30288
S/109/61/006/011/003/021
D246/D304

9.1400 (1144)

AUTHORS: Akhmanov, S.A., and Khokhlov, R.V.

TITLE: The transformation of random signals in non-linear lines

PERIODICAL: Radiotekhnika i elektronika, v. 6, no. 11, 1961, 1813 - 1824

TEXT: So far only regular signals have been studied in non-linear lines. The authors analyze the course of a weak random signal along a non-linear line which simultaneously passes a regular signal of finite amplitude. The basic equation representing such a line is

$$\frac{\partial^2 V}{\partial z^2} - L\frac{\partial^2 Q}{\partial t^2} - L\frac{\partial GV}{\partial t} - L\frac{\partial I}{\partial t} = 0 \qquad (3)$$

where G - conductivity. Introducing new variables:

$$\xi = t + \frac{z}{u}, \qquad \eta = t - \frac{z}{u}, \qquad (5)$$

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assuming

$$V = V(\eta, \varepsilon\zeta), \tag{6}$$

one obtains a solution (non-linear symbolic equations) for slowly varying amplitude V, and phase

$$\frac{\partial V_1}{\partial \zeta} - \beta V_p V_1 \cos 2\varphi + \delta(V_1) V_1 + F_1(\zeta) = 0, \tag{11a}$$

$$\frac{\partial \varphi}{\partial \zeta} + \gamma + \beta V_p \sin 2\varphi + \frac{1}{V_1} F_2(\zeta) = 0. \tag{11b}$$

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where $\beta = \frac{LDu^2\omega}{4}$; $\gamma = \frac{\omega}{4} u^2 (\frac{1}{u^2} - LC)$ and the random forces $F_1(\zeta)$ and $F_2(\zeta)$ are

$$F_{1,2} = \frac{Lu^2}{2\omega} \frac{\omega}{\pi} \int_{-\frac{\pi}{\omega}}^{\frac{\pi}{\omega}} \dot{I} \begin{Bmatrix} \cos(\omega\eta + \varphi) \\ \sin(\omega\eta + \varphi) \end{Bmatrix} d\eta. \tag{13}$$

First the authors take the simple case of a "noiseless" line (external forces $F_{1,2} = 0$). Then (11b) can be solved independently. They examine the case when $\beta V_p \gg /\gamma/$ and consequently

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$$\cos 2\varphi_{est} > 0. \tag{18}$$

In this case the propagation of signal can be accompanied by the exponential increase of the amplitude. For the simple case of $\gamma = 1$, the expressions for the phase and amplitude are the following

$$\varphi = \operatorname{arc\,tg}[e^{2\beta V_p(\eta - \zeta)} \operatorname{tg} \varphi_0(\eta)] = \operatorname{arc\,tg}[e^{-4\beta V_p \frac{z}{pu}} \operatorname{tg} \varphi_0(t - \frac{z}{u})], \tag{19}$$

$$V_1 = V_0\left(t - \frac{z}{u}\right)\sqrt{\cos^2\varphi_0\left(t - \frac{z}{u}\right) + \sin^2\varphi_0\left(t - \frac{z}{u}\right)e^{-8\beta V_p \frac{z}{u}}} \times \tag{23}$$
$$\times \exp\left[\beta V_p - \delta(0)\right]\frac{2z}{u}.$$

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On this basis one may analyze the behavior of weak random signals. On the line they are functions of t & z. Assuming one known their distribution and correlation functions at $z = 0$, $W_0(\varphi_0)$ from (19) and (23) one can calculate them at any point. The authors show on a series of curves, that the phase of the output signal can take only one of two discrete values and the output amplitude is practically independent of the input amplitude. So the fluctuations of

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the input signal may show up at the output only in this choice of two possible stable states. Hence, from this relative time spent in that state, one may obtain information on the distribution function of the input signal which may serve as a basis for building a phase filter. The noise, produced by the line itself, however, may reduce this information; therefore the authors analyze separately the statistics of the phase of a weak signal in a "noisy" line. Introducing a quantitative measure for the loss of information

$$M = \frac{P_1(z) - P_2(z)}{P_1(0) - P_2(0)} \leqslant 1, \quad /M = 1 \text{ for a noisless line}/ \tag{27}$$

where

$$P_{1,2}(z) = \int_{I,II} W_z(\varphi)\, d\varphi; \quad P_{1,2}(0) = \int_{I,II} W_0(\varphi_0) d\varphi_0. \tag{28}$$

The authors investigate the case, interesting for a phase filter, when $M \simeq 1$. Then the presence of the output phase in one of the stationary states is determined basically by the boundary conditions. The probability that a phase φ_0 at the input, will fall in a "strange" region (for $z \geqslant 1/8\ u/\beta V_p$) is

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$$\frac{1}{\sqrt{2\pi}}\int_{\frac{\varphi_0}{B}}^{\infty} e^{-y^2}\,dy, \qquad (42)$$

where

$$B = \frac{\sqrt{\overline{F_1^2}}}{2V_0}\,\frac{1}{\sqrt{\beta V_p}}. \qquad (43)$$

The condition $B^2 \leq 1$ (51)
indicates what requirements the parameters of the line and amplitude of the weak signal have to satisfy in the construction of a phase filter. There are 3 figures and 11 references: 9 Soviet-bloc and 2 non-Soviet-bloc. The reference to the English-language publication reads as follows: P.K. Tien, J. Appl. Phys., 1958, 29,9 1347.

ASSOCIATION: Fizicheskiy fakul'tet Moskovskogo gosudarstvennogo Universiteta im. M.V. Lomonosova (Faculty of Physics, Moscow State University im. M.V. Lomonosov)

SUBMITTED: March 31, 1961

SOLUYAN, S.I.; KHOKHLOV, R.V.

Propagation of acoustic waves of finite amplitude in a dissipative medium. Vest. Mosk. un. Ser. 3: Fiz., astron. 16 no.3:52-61 My-Je '61. (MIRA 14:7)

1. Kafedra teorii kolebaniy Moskovskogo gosudarstvennogo universiteta.

(Sound waves)

27199

S/056/61/041/002/021/028
B111/B212

26.2311

AUTHORS: Soluyan, S. I., Khokhlov, R. V.

TITLE: Theory of simple magnetohydrodynamic waves with a finite amplitude in a dissipative medium

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 2, 1961, 534-543

TEXT: The fundamental magnetohydrodynamic equations are simplified for small initial perturbations and small energy dissipation. The following set of equations is found:

$$\partial v_x/\partial x - \alpha v_x \partial v_x/\partial \tau = \delta \partial^2 v_x/\partial \tau^2, \quad (13),$$

$$\alpha = \frac{1}{2u_{1,2}^2}\left\{(\gamma+1) + \frac{(2-\gamma)(u_{1,2}^2-u_0^2)^2}{(u_{1,2}^2-u_0^2)^2 + H_y^2 u_0^2/4\pi\rho_0}\right\}, \quad (14).$$

$$\delta = \left\{(u_{1,2}^2-u_0^2)^2(\eta+\beta\rho_0) - (u_{1,2}^2-u_0^2)\frac{H_y^2}{4\pi\rho_0}\eta + \right.$$

$$\left. + \frac{H_y^2}{4\pi\rho_0}\left[u_0^2\frac{\gamma-1}{\gamma}\frac{\varkappa}{c_v} + u_{1,2}^2\left(\frac{4}{3}\eta+\zeta\right)\right]\right\}\left\{2\rho_0 u_{1,2}\left[(u_{1,2}^2-u_0^2)^2 + \frac{H_y^2}{4\pi\rho_0}u_0^2\right]\right\}^{-1}. \quad (15).$$

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